

Appln. No. 10/518,137
Amendment dated July 17, 2006

Amendments to the Claims:

Please amend claims 1, 3, 5 and 7 as follows. The following listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (Currently Amended). A fly-back type synchronous rectifying switching power supply device ~~in which~~ comprising a primary winding of a transformer and a main switch element [[are]] connected to each other in series between input terminals
5 and which has a control circuit for subjecting the main switch element to PWM control within a fixed period, a synchronous rectifying element connected to a secondary winding of the transformer in series between output terminals, and driving means for turning on the synchronous rectifying element complementarily
10 with the switching element, ~~characterized by further comprising~~ a different power supply source charged by a pulse voltage occurring at the secondary [[side]] winding of the transformer through a switching operation of the main switch element, and interrupting means ~~which is~~ disposed between the gate and source
15 of the synchronous rectifying element and which turns off the synchronous rectifying element, wherein an off-timing at which

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the interrupting means turns off the synchronous rectifying
element is set to a timing which corresponds to a fixed time set
by current from the different power source after the switch
20 element is turned on and is within a range which is as near as a
fixed driving period of the switch element.

Claim 2 (Original). The synchronous rectifying switching
power supply device according to claim 1, wherein the
interrupting means comprises a transistor and a timing capacitor
connected to a signal input terminal of the transistor, the
5 timing capacitor is charged by the different power source and
discharged at the instantaneous time when the main transistor is
turned on, the timing capacitor is started to be charged from the
instantaneous time concerned, and a period from this time to a
time in which the voltage of the timing capacitor exceeds a
10 threshold value of the signal input terminal of the transistor is
set to a time within the fixed driving period of the switch
element.

Claim 3 (Currently Amended). The synchronous rectifying
switching power supply device according to claim 2, wherein the
different power source is a constant voltage source or constant

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current source connected to the secondary [[side]] winding of the
5 transformer.

Claim 4 (Original). The synchronous rectifying switching
power supply device according to claim 3, wherein a snubber
circuit for absorbing surge energy when the synchronous
rectifying element is turned off is provided to the different
5 power source for charging the timing capacitor so that the timing
capacitor is charged with the energy absorbed by the snubber
circuit.

Claim 5 (Currently Amended). A fly-back type synchronous
rectifying switching power supply device ~~in which~~ comprising a
primary winding of a transformer and a main switch element
[[are]] connected to each other in series between input terminals
5 and which has a control circuit for subjecting the main switch
element to PWM control within a fixed period, a synchronous
rectifying element connected to a secondary winding of the
transformer in series between output terminals, and driving means
for turning on the synchronous rectifying element complementarily
10 with the switching element, ~~characterized by further comprising~~ a
different power supply source charged by a pulse voltage
occurring at the secondary [[side]] winding of the transformer

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through a switching operation of the main switch element,
interrupting means ~~which is~~ disposed between the gate and source
15 of the synchronous rectifying element and which turns off the
synchronous rectifying element, and a control element for
comparing the output voltage of the different power source with
the output voltage of the output terminal of the switching power
supply device, and controlling the interrupting means to turn off
20 the synchronous rectifying element when the output voltage of the
different power source is reduced to a fixed value or less.

Claim 6 (Original). The synchronous rectifying switching
power supply device according to claim 5, wherein a transistor of
the interrupting means is an npn transistor for turning off the
synchronous rectifying element, and the control element comprises
5 a pnp transistor whose emitter and collector are connected to the
output terminal and the base of the npn transistor respectively,
and the output of the different power source is connected to the
base of the pnp transistor.

Claim 7 (Currently Amended). The synchronous rectifying
switching power supply device according to claim 6, wherein the
different power source is a constant voltage source connected to
the secondary [[side]] winding of the transformer, and an output

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- 5 voltage of the different power source is divided to input the divided voltage to the base of the pnp transistor.

Claim 8 (Original). The synchronous rectifying switching power supply device according to claim 7, wherein a snubber circuit for absorbing surge energy when the synchronous rectifying element is turned off is provided to the different
5 power source for charging the timing capacitor, and the timing capacitor is charged with the energy absorbed by the snubber circuit.